Appendix A

Calculation of "Standard Error" of Average BLI
(Description of Methodology)

In response to a contention raised by the Ad Hoc Telecommunications Users Committee, we have provided an analysis which was performed to determine whether "the uncertainty that is associated with survey results" could have materially affected the results outlined in the Godwins Report. The methodology employed in that analysis is described below.

The Godwins BLI database is extensive (830 plans in all) and holds data on Plans for 18 million participants out of a universe of 38 million participants. Statistical sampling error should have been minor. Godwins tested this hypothesis by calculating standard errors for the pre-65 and post-65 average BLI's. The analysis took account of the six industry groups used in the USTA Report, the BLI weightings within each industry group, the weightings of the industry-group BLI's in developing the final averages, and of the finite universe effect whereby dispersion tends to zero when a sample enlarges to exhaust the universe.

For each industry group (i=1, i=2, ... i=6) a variance was calculated for the set of BLI_j's (j=1, N_i) observed for the group, N_i being the number of Plans in the Godwins database for industry group i. Weighted means were used in the USTA study, and the variance for the weighted mean for industry group i was calculated as the variance of the observed BLI_j's times the sum of the squares of the weights based on participant counts in the plans included in the industry group. The Godwins database has information for substantial percentages of covered employees in each industry group. The total number of plans in each industry group, T_i, was taken as the number of plans in the Godwins database for the industry group, N_i, times the ratio of covered employment for the industry group in the economy (a GAO figure) to the covered employment included in the Godwins database for the industry group. A standard adjustment factor of $(T_i - N_i) / (T_i - 1)$ was applied to account for the "finite universe effect".

The estimate of the variance of the means was taken as the sum of the products of the square of the "GAO weights" times the estimates of the industry-group variances. The square root of the estimate is the measure of the dispersion of the means. Numerical results from the calculations are summarized on the chart attached hereto. We see that pre-65 and post-65 dispersions are minor when contrasted to their corresponding means.

Calculation of "Standard Error" of Average BLI's
(Results)

Industry Group number:	(1)	(2)	(3)	(4)	(5)	(6)	Total
Number of Plans in GODWINS' database:	446	6	78	31	222	47	830
Number of Employees covered by such Plans:	11,129,686	94,893	1,472,589	1,884,054	3,549,719	780,402	18,911,343
Number of covered employees in economy (GAO):	11,602,872	562,891	8,853,209	3,962,734	10,431,800	3,040,556	38,454,062
Pre Age 65							
Weighted mean BLI for group:	0.7232	0.7758	0.7974	0.4730	0.6721	0.5771	0.6898
Variance of BLI's in group:	0.049191	0.060456	0.041069	0.067315	0.040691	0.068032	
Variance of weighted mean for group:	0.000711	0.028462	0.002895	0.006361	0.000747	0.004062	
Variance adjusted for Finite Universe effect:	0.000029	0.024396	0.002419	0.003379	0.000494	0.003035	0.000227
Dispersion of weighted mean:							0.015076
Mean + 1 standard deviation:							0.7049
Mean - 1 standard deviation:							0.6747
Post Age 65							
Weighted mean BLI for group:	0.2340	0.0604	0.2643	0.0603	0.1926	0.1267	0.2008
Variance of BLI's in group:	0.019851	0.022000	0.011883	0.011052	0.015966	0.018178	
Variance of weighted mean for group:	0.000287	0.010357	0.000838	0.001044	0.000293	0.001085	
Variance adjusted for Finite Universe effect:	0.000012	0.008878	0.000700	0.000555	0.000555	0.000811	0.000065
Dispersion of weighted mean:							0.008080
Mean + 1 standard deviation:							0.2089
Mean - 1 standard deviation:							0.1927

Appendix B

Average Age / Average Service for Mature Populations

Promulgated from Varying Turnover and Retirement Assumptions

Average Age

Age of New Hires	T2 RA 62	T2 RA 63	T2 RA 64	T6 RA 62	T6 RA 63	T6 RA 64	T10 RA 62	T10 RA 63	T10 RA 64
25	39.94	40.35	40.76	36.96	37.24	37.53	31.02	31.09	31.16
26	40.75	41.16	41.58	37.88	38.18	38.48	32.16	32.23	32.31
27	41.54	41.96	42.38	38.80	39.11	39.42	33.29	33.38	33.47
28	42.32	42.74	43.17	39.71	40.02	40.34	34.43	34.53	34.63
29	43.08	43.51	43.94	40.60	40.93	41.26	35.56	35.68	35.79
30	43.83	44.27	44.70	41.48	41.81	42.16	36.70	36.82	36.95
31	44.57	45.01	45.45	42.34	42.69	43.04	37.82	37.96	38.11
32	45.29	45.74	46.18	43.19	43.55	43.91	38.94	39.10	39.26
33	46.00	46.45	46.90	44.02	44.39	44.77	40.05	40.22	40.40
34	46.69	47.14	47.60	44.84	45.22	45.60	41.14	41.34	41.53
35	47.36	47.82	48.28	45.64	46.03	46.43	42.22	42.43	42.64

Average Service

Age of New Hires	T2 RA 62	T2 RA 63	T2 RA 64	T6 RA 62	T6 RA 63	T6 RA 64	T10 RA 62	T10 RA 63	T10 RA 64
25	14.94	15.35	15.76	11.96	12.24	12.53	6.02	6.09	6.16
26	14.75	15.16	15.58	11.88	12.18	12.48	6.16	6.23	6.31
27	14.54	14.96	15.38	11.80	12.11	12.42	6.29	6.38	6.47
28	14.32	14.74	15.17	11.71	12.02	12.34	6.43	6.53	6.63
29	14.08	14.51	14.94	11.60	11.93	12.26	6.56	6.68	6.79
30	13.83	14.27	14.70	11.48	11.81	12.16	6.70	6.82	6.95
31	13.57	14.01	14.45	11.34	11.69	12.04	6.82	6.96	7.11
32	13.29	13.74	14.18	11.19	11.55	11.91	6.94	7.10	7.26
33	13.00	13.45	13.90	11.02	11.39	11.77	7.05	7.22	7.40
34	12.69	13.14	13.60	10.84	11.22	11.60	7.14	7.34	7.53
35	12.36	12.82	13.28	10.64	11.03	11.43	7.22	7.43	7.64

Appendix C

Additional Sensitivity Analysis

Extreme Parameter Values Leading to Low Estimates of the Percentage of Additional SFAS 106 Costs to be Met from Other Sources

Additional SFAS 106 Costs of Average Employer with SFAS 106 Liabilities

Labor Supply Elasticity	2% (a)	2% (b)	2% (c)	3% (a)	3% (b)	3% (c)	5% (a)	5% (b)	5% (c)
0.0	0.9	12.0	87.1	2.0	17.5	80.5	5.4	27.5	67.1
0.1	3.9	10.0	86.1	6.4	14.6	79.0	12.5	22.8	64.7
0.2	6.7	8.1	85.2	10.6	11.8	77.6	19.4	18.3	62.3
0.3	9.4	6.4	84.2	14.6	9.1	76.3	26.0	13.9	60.1

(a) reflected in GNP-PI
(b) financed by potential reduction in the wage
(c) to be met from other sources

price elasticity of demand = 3.0
share of labor costs in total cost in sector 1 = 0.78
share of labor costs in total cost in sector 2 = 0.78
initial fraction of labor employed in sector 2 = 0.4

Attachment F - 1992 Godwins Additional Sensitivity Analysis

UNITED STATES TELEPHONE ASSOCIATION

Analysis of Impact of SFAS 106 Costs on GNP-PI

Supplemental Report:
Additional Sensitivity Analysis

GODWINS

March, 1993

UNITED STATES TELEPHONE ASSOCIATION

ANALYSIS OF IMPACT OF SFAS 106 COSTS ON GNP-PI

ADDITIONAL SENSITIVITY ANALYSIS

March 31, 1993

Godwins

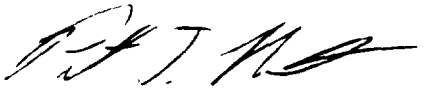
TABLE OF CONTENTS

BACKGROUND

Over the last eighteen months Godwins has been working with the United States Telephone Association to analyze the impact of SFAS 106 costs on the GNP-PI and, in particular, to determine what portion of the increase in costs experienced by the Price Cap LECs due to SFAS 106 will, in fact, not be reflected in the GNP-PI or any other macroeconomic effect.

In February, 1992 we issued the results of our analysis, indicating that approximately 85% of the LECs' additional costs would <u>not</u> be reflected in the GNP-PI or recovered through other macroeconomic effects. In July 1992 we issued a supplemental report responding to objections and questions regarding our initial report. Since that time, the FCC issued an order denying exogenous treatment for any SFAS 106 costs for the Price Cap LECs. After reviewing the order and discussing it with the Commission's staff, the USTA has concluded that the FCC may not have fully appreciated the conservative nature of our study, nor the relevance and importance of the sensitivity analysis included in the original report. As a result, the USTA has asked Godwins to produce this supplemental report, which more fully describes the fundamental conservatism of our approach and presents the results of a newly expanded sensitivity analysis.

Respectfully submitted,



Peter J. Neuwirth, F.S.A., M.A.A.A.

Andrew B. Abel, Ph.D.

INTRODUCTION

The fundamental results of the initial Godwins study were derived by the use of a macroeconomic model, as described beginning on page 26 of Godwins' February, 1992 report. This model takes as input six basic parameters. In choosing the values for those six parameters we utilized the best available information. When there was a great deal of information available we chose as accurate a value as possible for the given parameter. When such information was lacking we were conservative and chose a value which would, if anything, overstate the impact of SFAS 106 on GNP-PI.

In its recent order, the FCC challenged two aspects of the Godwins study. First, in comparing the analysis performed by our firm with one performed by NERA, the FCC expressed concern that the studies relied upon different assumptions regarding the impact of SFAS 106 on companies' pricing decisions. Secondly, the FCC expressed concern that our results might be unreliable due to the wide variety of possible parameter input value combinations which might be applicable.

Section I of this report addresses the first issue raised by the FCC, while Sections II and III address the FCC's second concern. Specifically, Section I demonstrates that while the basic underlying assumptions as to pricing behavior may differ between the Godwins and NERA studies, the approach chosen by Godwins is, in fact, more conservative than that used by NERA.

With respect to the FCC's second concern, we point out that Section IV of Godwins' original report described a sensitivity analysis that was performed in order to determine how much our results would change if we had chosen different values for the parameters. While we believe this should have been sufficient to address any concerns as to the reliability of our results, we have now expanded that sensitivity analysis considerably. Section II of this report examines the six parameters separately, and determines the range of realistic values for each. In Section III we calculate and report what the results of our study would have been, had we used <u>any</u> possible combination of values for the six parameters.

SECTION I

DEMONSTRATION OF CONSERVATIVE NATURE OF GODWINS APPROACH RELATIVE TO NERA

In addition to the Godwins Study submitted by the USTA, a study performed by NERA was submitted to the FCC. In paragraph 62 of its order the FCC states that:

> "While Godwins assumes that companies respond to their booked costs, NERA reasons that non-regulated companies set prices based on economic costs, which are better reflected in accrual accounting than pay-as-you-go. According to NERA, non-regulated firms thus have already reflected accrued OPEB costs in their prices, but regulated firms did not, because their prices have been based upon accounted-for costs plus profits."

It seems, therefore, that NERA argues that the introduction of SFAS 106 is merely an accounting change rather than a real change in firms' costs. For unregulated firms, any effect on costs due to OPEBs had already been factored into prices prior to the introduction of SFAS 106. However, firms with regulated prices who sponsor OPEBs had not been given the opportunity to seek recovery for these OPEB costs prior to the introduction of SFAS 106. These regulated firms are the only firms in the economy whose costs and prices may increase as a direct effect of SFAS 106 as these firms seek recovery for OPEBs from regulators.

In principle, the Godwins model could be applied to calculate the effect on GNP-PI under the NERA assumption that SFAS 106 would have a direct effect only on the prices of regulated firms offering OPEBs covered by SFAS 106. To apply the Godwins model, we would let sector 1 be the unregulated sector, plus those regulated firms that do not offer OPEBs covered by SFAS 106. Sector 2 would consist of that portion of the regulated sector of the economy which sponsors OPEBs covered by SFAS 106. We would need to know the values of the following parameters: (1) the share of labor cost in total cost in sector 1; (2) the share of labor cost in total cost in sector 2; (3) the share of employment in sector 2; and (4) the direct impact of SFAS 106 on labor costs in sector 2. To obtain the values of these parameters would require an economic analysis for the first three parameters and an actuarial analysis for the fourth parameter. It is far beyond the scope of our assignment to carry out the requisite analyses to obtain reliable values for these parameters. However, we have performed two sets of illustrative calculations that clearly demonstrate that the Godwins approach is, in fact, more conservative than NERA's, and had NERA's approach been used by us, a significantly higher percentage of the LECs' SFAS 106 costs would have been found to be unrecovered by GNP-PI increases or other macroeconomic effects.

While only rough approximations to the comprehensive analysis just described, these calculations again serve to underscore the conservative nature of our original study. To reiterate, any change in the underlying assumptions in the Godwins study to be more consistent with NERA's approach would result in a much larger percentage of TELCO's SFAS 106 costs remaining unrecovered.

Illustrative Calculations Part I: One way to describe the difference between the Godwins and NERA studies is that NERA assumes OPEBs were already completely factored into the prices of (unregulated) firms before the introduction of SFAS 106, whereas Godwins assumes that no additional OPEB costs were factored into the prices of firms prior to the introduction of SFAS 106. We can look for middle ground between these two polar cases by assuming that firms had already factored in a fraction x of the increase in accounting costs due to the introduction of SFAS 106. We will let x take on the values 0, 0.25, 0.50, 0.75, and 1.0. Using the conservative baseline value of 3.0% for the direct impact of SFAS 106 on labor costs for firms offering OPEBs, these values of x correspond to values of 3.0%, 2.25%, 1.50%, 0.75% and 0% for the direct impact of SFAS 106 on labor costs for firms in sector 2. Note that with x = 1, there will be no impact on GNP-PI and no other macroeconomic effects. On the other hand, with x = 0, we will obtain the baseline results of the Godwins study.

Illustrative Calculations Part II: As stated above, under the NERA assumptions, sector 2 in the Godwins macroeconomic model should correspond to the set of regulated firms in the United States that offer OPEBs covered by SFAS 106. Clearly, the employment in these firms accounts for less than 32% of private sector employment, which is the share of private sector employees who work for firms that offer OPEBs covered by SFAS 106. We do not know exactly how much smaller than 32%, so we try various values. Specifically, we run the baseline calculations of the Godwins model except that we allow the share of private sector employment in sector 2 to be a fraction y of 32%, where y = 0.25, 0.50, 0.75, and 1.0. Thus, we let the share of private sector employment in sector 2 be 8%, 16%, 24%, and 32%. Of course, using a value of 32% is identical to the baseline calculations in the Godwins report.

The results of both of the above sets of illustrative calculations are shown in Exhibit 1 on the next page.

EXHIBIT 1

Results of Illustrative Calculations

	direct impact of SFAS 106 on labor costs in sector 2	share of private employment in sector 2	(a)	(b)	(c)
Godwins baseline:	3.00%	0.32	0.7 %	14.5 %	84.8 %
Part I:					
	0.75%	0.32	0.04%	3.77%	96.19%
	1.50%	0.32	0.17%	7.44%	92.38%
	2.25%	0.32	0.39%	11.03%	88.58%
Part II:					
	3.0%	0.24	0.57%	10.88%	88.55%
	3.0%	0.16	0.42%	7.24%	92.34%
	3.0%	0.08	0.23%	3.61%	96.16%

percentage of additional SFAS 106 costs:

(a) reflected in GNP-PI

(b) financed by potential wage reduction and other macroeconomic adjustments

(c) to be met from other sources

Values of other parameters (same as baseline values used in the original Godwins study):
price elasticity of demand = 1.5
share of labor cost in total cost, sector 1 = 0.64
share of labor cost in total cost, sector 2 = 0.64
labor supply elasticity = 0.0

SECTION II

DETERMINATION OF RANGE OF VALUES FOR INPUT PARAMETERS

In this Section we examine the development of each of the six parameters that serve as input to our macroeconomic model, and determine a basis for the expanded sensitivity analysis. The results of this analysis are described in Section III.

1. Increase in Labor Costs Due to SFAS 106

The most important input to the macroeconomic model is the impact of SFAS 106 on labor costs in the sector of the economy that provides post-retirement benefits (sector 2). In our original report we determined this value to be 3.18%. As discussed in the report, the derivation of this value required us to make certain estimates and assumptions of both a demographic and economic nature. Our approach in making those estimates was to try to be as accurate as possible when there was sufficient data to make an informed estimate, but to be conservative (i.e. overstate the impact of SFAS 106) when only limited information was available. We believe that this approach has resulted in a value which is, if anything, higher than the actual impact that SFAS 106 will have on sector 2 and hence on GNP-PI.

In spite of the above, there is no doubt that a range of possible values exists within which the true impact of SFAS 106 will lie. In our original report we prepared a sensitivity analysis that encompassed a range from 2% to 5%. That range was based on only limited quantitative analysis, but it was our opinion that the range was more than sufficient to account for any uncertainty in our baseline determination. We have now taken a closer look at that analysis and concluded that a more precisely determined range of possible values runs from 2.13% to 4.47%. Furthermore, we have looked again at the development of our baseline value, and concluded that if we had taken a "best estimate" approach on all assumptions and estimates, we would have estimated that the impact of SFAS 106 on the labor costs in sector 2 would have been 2.54%, rather than 3.18%. The remainder of this section describes how each of the end points of the range, as well as the "best estimate" value, were determined.

As noted on page 38 of our original report, the baseline value of the direct impact of SFAS 106 on sector 2 was determined by taking the impact on TELCO's labor costs (6.3%) and multiplying this value by adjustment factors (3), (4), (5), (6) and (8), described on pages 8 and 9 of the original report. These factors are as follows:

(3) BLI Ratio = .5850
(4) Demographic Adjustment = .5438
(5) Current Retiree Adjustment = .9287
(6) Pre-Funding Adjustment = 1.313
(8) Per Unit Labor Cost Adjustment = 1.3062

6.3% x .5850 x .5438 x .9287 x 1.313 x 1.3062 = 3.18%

It is clear from what is shown above that the range of possible variation around the 3.18% baseline value can be determined by looking at what value results, when each of the adjustments is determined by using either the most conservative or the least conservative possible assumptions. We have determined these extreme values for each of the five relevant adjustments, as well as noting where a "best estimate" value would differ from the baseline values shown in our report.

BLI Ratio - In calculating GNP BLI and TELCO BLI, and therefore the BLI ratio, there were two areas of uncertainty. With respect to the calculation of GNP BLI we utilized average BLIs by industry, and then utilized industry weightings derived from the GAO survey, to derive a final GNP BLI. We believe that this is the most accurate approach. The only other reasonable alternative approach would have been to utilize an aggregate employee weighted average based on our data base. As it happens this approach is slightly more conservative, and results in a BLI ratio of .5952. This can be viewed as the most conservative possible value for this factor, because the other area of uncertainty was with respect to the calculation of TELCO BLI, and there we took the most conservative approach rather than try to make a "best estimate". Specifically, in deciding how to weight the various plans sponsored by each Price Cap LEC, we decided to weight them based on employee counts. We believe this was a conservative approach because our GNP data base maintained only one set of plan provisions for each employer. If we had taken a best estimate approach and assumed that, where an employer had more than one plan, it was the more generous plan which was reported in the data base, then it would have been appropriate to utilize only the more generous plans in calculating the TELCO BLI. If we had taken this approach, the BLI ratio would have become .5478. Thus, with respect to the BLI ratio we find the following:

BLI Ratio (used in study)	.5850
BLI Ratio (most conservative)	.5952
BLI Ratio (best estimate)	.5478
BLI Ratio (least conservative)	.5478

Demographic Adjustment - We adjusted for the fact that TELCO will utilize lower rates of turnover and higher retirement rates at earlier ages than those used by other employers in determining SFAS 106 costs. We also included in this adjustment the basic demographic differences in current age and service between the TELCO population and the economy as a whole. As noted in the report, our approach to the turnover rates was a best estimate approach, for which there was solid evidence. (TELCO's demographics are themselves the result of lower turnover rates actually experienced by TELCO). A more conservative, but only marginally reasonable, approach would be to assume the same withdrawal patterns for both TELCO and GNP. There is no comparable benchmark to utilize as a least conservative approach.

The adjustment due to age and past service differences is also a best estimate approach, in that it relies on demographic data provided by the separate Price Cap LECs, averaged into a single composite TELCO census, having an average age of 41.6 with average past service of 16.6 years. Recognizing that arithmetic averages are not the same as plan weighted averages, we could have taken a more conservative approach and assumed that the TELCO population was actually one year younger and had one year less past service. This one year change is more than sufficient to take account of any differences between arithmetic and plan weighted averages. Obviously, the plan weighted average age and service for TELCO might be higher than 41.6 and 16.6, so a least conservative estimate would be to utilize 42.6 and 17.6 for TELCO's average age and service.

A degree of uncertainty is also present in our adjustment due to earlier retirement among TELCO employees. This uncertainty arises in the determination of a national average retirement age assumption. We believe our use of age 63 was a conservative assumption in that the limited data on the subject (Gerontologist Vol. 28, No. 4) seems to indicate a national average retirement age between 63.5 and 64. Furthermore, if, as expected, employers in the GNP tend to be aggressive (i.e., optimistic) in setting assumptions for accruing post-retirement liability, a less conservative and, in fact, best estimate approach would be to utilize an age 64 assumption.

Based on the above considerations we would then derive the following possible values for the Demographic Adjustment:

Demographic Adjustment (used in study) = .5438
(GNP retirement = 63)
(TELCO turnover < GNP turnover)
(Age = 41.6 Service = 16.6)

Demographic Adjustment (most conservative) = .7522
(GNP retirement = 63)
(TELCO turnover = GNP turnover)
(Age = 40.6 Service = 15.6)

Demographic Adjustment (best estimate) = .4936
(GNP retirement = 64)
(TELCO turnover < GNP turnover)
(Age = 41.6 Service = 16.6)

Demographic Adjustment (least conservative) = .4706
(GNP retirement = 64)
(TELCO turnover < GNP turnover)
(Age = 42.6 Service = 17.6)

Current Retiree Adjustment - The calculation of this adjustment was predicated on an average claim rate per retiree for the GNP of $1,802 and a ratio of retirees to covered actives of .1726. The claim rate was derived by taking the 1990 rate of $1,514, as reported in the Hewitt Associates Survey of Retiree Medical Benefits, and increasing it by 19% for medical trend inflation. This 19% is consistent with the results of Godwins Inc.'s annual survey of insurance

carrier trend rates. The ratio of retirees to covered actives was derived from the GAO study. While these represent "best estimates", both parameters could vary in either direction. We have therefore calculated a more conservative value, assuming national per retiree costs increased 25% to $1,892, and that the actual ratio of retirees to actives has increased to .2 (from .1726); and a less conservative value, assuming national per retiree costs increased 13% between 1990 and 1991, and that the ratio of covered retirees to actives decreased to .15.

Also inherent in this Adjustment is the assumption that the demography of the current TELCO retirees is identical to that of the GNP retirees. In fact, this is likely to be a somewhat conservative assumption because TELCO employees generally retire at younger ages than the national average, and thus the liabilities for TELCO will tend to be higher on this account than for the retirees in the national economy. A better assumption would therefore be to assume that retirees at TELCO were somewhat younger than those in the GNP, and hence generated a SFAS 106 cost per $1 of retiree claim cost that was 5% more than that for the GNP. A most conservative approach would be to assume that TELCO retirees are somewhat older and generated 10% less SFAS 106 cost per $1 of retiree claims, and a least conservative approach would assume 20% greater SFAS 106 cost per $1 of retiree claims than the GNP. When combined with the range of BLI ratios and Demographic Adjustments previously determined, this then results in the following values for the Current Retiree Adjustment:[1]

Current Retiree Adjustment (used in study) = .9287
(Trend = 19%)
(Retiree/active = .1726)
(TELCO retirees = GNP retirees)

Current Retiree Adjustment (most conservative) = .9232
(Trend = 25%)
(Retiree/active = .2)
(TELCO retirees older then GNP)

Current Retiree Adjustment (best estimate) = .9455
(Trend = 19%)
(Retiree/active = .1726)
(TELCO retirees younger than GNP)

Current Retiree Adjustment (least conservative) = .9076
(Trend = 13%)
(Retiree/active = .15)
(TELCO retirees much younger than GNP)

---

1 Note that the development of the range of estimates for this adjustment is not independent of previously developed ranges. Thus some of the values for this adjustment may appear "out of order".

Pre-Funding Adjustment - This adjustment looked at the effect of TELCO's existing pre-funding of post-retirement medical benefits as compared with no pre-funding. By doing this we made the most conservative assumption possible, i.e., that there is no pre-funding in the GNP. We have now recalculated this adjustment, making the more reasonable assumption that there is pre-funding in the GNP to the extent that assets equal to one year's claims have accumulated, and that annual contributions to such funds amount to claims plus 10%. We have also made the same calculation under the less conservative assumption of two years' claims accumulated and additional contributions of 20% of claims.

As a result we now have the following values:

Pre-funding Adjustment (used in study) = 1.313
Pre-funding Adjustment (most conservative) = 1.313
Pre-funding Adjustment (best estimate) = 1.205
Pre-funding Adjustment (least conservative) = 1.106

Per Unit Labor Cost Adjustment - In calculating Per Unit Labor Cost Adjustment, allocated compensation and headcount were used. No sensitivity analysis was performed on this Adjustment because of the validity of the data used and the straightforward nature of the calculation. Therefore for purposes of this analysis:

Per Unit Labor Cost Adjustment (used in study) = 1.3062
Per Unit Labor Cost Adjustment (most conservative) = 1.3062
Per Unit Labor Cost Adjustment (best estimate) = 1.3062
Per Unit Labor Cost Adjustment (least conservative) = 1.3062

Input to the Macroeconomic Model - Combining the results of the analysis described above, we find that the range of possible values for the increase in labor costs for the sector of the economy that provides post-retirement benefits encompasses the following values:

Baseline (used in study) = 6.3% x .5850 x .5438 x .9287 x 1.313 x 1.3062 = 3.18%
Most Conservative = 6.3% x .5952 x .7522 x .9232 x 1.313 x 1.3062 = 4.47%
Best Estimate = 6.3% x .5478 x .4936 x .9455 x 1.205 x 1.3062 = 2.54%
Least Conservative = 6.3% x .5478 x .4706 x .9076 x 1.106 x 1.3062 = 2.13%

2. Other Parameters

In addition to the direct impact of SFAS 106 on labor costs in sector 2, the macroeconomic model uses input values for five other parameters. For the sensitivity analysis of each of these five parameters, we use the same values as in the original Godwins Report, as discussed below. However, the current sensitivity analysis is much more extensive than in the original report. Specifically, the current sensitivity analysis examines all possible combinations of the parameter input values.

Two of the parameters are production function parameters: the share of labor cost in total cost for sector 1, and the share of labor cost in total cost for sector 2. The baseline value of each of these parameters was chosen to be 0.64, which matches the share of labor cost in total cost for the economy as a whole.[2] For the economy as a whole, the share of labor cost in total cost is remarkably constant over time. Nevertheless, the sensitivity analysis explored the effects of rather large variations in the share of labor cost in total cost for individual sectors. The range of variation was chosen to be symmetric around 0.64 and to allow the share of labor cost in total cost to be as low as 0.50 for each sector. Thus, including the baseline value, the three values used for this parameter in each sector are 0.50, 0.64, and 0.78.[3]

One of the input parameters is the share of labor employed in sector 2 (the sector which provides OPEBs subject to SFAS 106). The GAO survey cited in the original Godwins Report indicated that 30.7 million out of 95.8 million (32.0% of 95.8 million) private sector employees are eligible to receive post-retirement health benefits subject to SFAS 106. Thus, the baseline value for this parameter was chosen to be 0.32. The GAO calculated that due to possible sampling error there was a 5% probability that the figure of 30.7 million could be either higher than 37.5 million (39.1% of 95.8 million) or lower than 23.9 million (24.9% of 95.8 million). Thus, including the baseline value, the three values used for this parameter are: 0.24, 0.32, and 0.40.

---

2 Labor income is computed as total compensation of employees plus two-thirds of total proprietors' income with inventory valuation and capital consumption adjustment. Using data on these components of labor income from Table B-22 of the 1993 *Economic Report of the President*, and data on GDP and GNP from Table B-20 of the 1993 *Economic Report of the President*, we obtain the following results for labor cost as a share of output:

labor cost	1987	1988	1989	1990	1991
as a share of GDP:	64.0%	64.0%	63.5%	64.0%	64.0%
as a share of GNP:	63.9%	63.9%	63.3%	63.8%	63.8%

3 As explained in some detail on page 17, the share of labor cost in total cost in the overall economy will not equal 0.64 (except for coincidence) when the share of labor cost in total cost takes on a value other than 0.64 in one or both sectors. Exhibit 3 reports the results of sensitivity analyses that vary the share of labor cost in total cost in each sector while maintaining an overall share of labor cost in total cost equal to 0.64.

Another input parameter is the price elasticity of demand for goods in each sector. Estimates of price elasticities of demand for various goods typically find elasticities to be about 1.0 or smaller,[4] and had we adopted a best estimate approach this is the value we would have used. Furthermore, broader categories of goods tend to have smaller price elasticities than do narrower categories of goods. The two categories of goods used in the macroeconomic model are extremely broad: one category accounts for about 2/3 of private sector output and the other category accounts for about 1/3 of private sector output. The price elasticities of demand for these two categories of goods are almost surely less than 1.0. Nevertheless, to guard against the possibility of understating the effect on GNP-PI of the introduction of SFAS 106, we purposely used values of the price elasticity of demand that are almost surely too high. Specifically, the baseline calculation uses a value of 1.5 for the price elasticity of demand. In addition to this baseline value, the sensitivity analysis considers a price elasticity of demand of 3.0. This value is too high to be plausible and its inclusion in the sensitivity analysis should be regarded simply as an exercise to show the sensitivity of the model's results to changes in the price elasticity of demand.

Finally, the model uses an input value for the wage elasticity of labor supply. The appropriate concept to be used here is a long-run labor supply elasticity rather than a short-run labor supply elasticity. The long-run elasticity is appropriate because the introduction of SFAS 106 represents a permanent change in the cost of labor for firms offering post-retirement health benefits covered by SFAS 106. Furthermore, the model is set up to focus on the long-run equilibrium after all adjustments have taken place. The importance of the distinction between long-run and short-run labor supply elasticities is that long-run labor supply elasticities tend to be smaller than short-run labor supply elasticities. Indeed, the long-run labor supply elasticity is probably even slightly negative. However, to guard against understating the impact on GNP-PI of the introduction of SFAS 106, the baseline calculation uses a value of 0.0 for the labor supply elasticity, which probably slightly overstates the true value of this elasticity. The sensitivity analysis explores the influence of this parameter on the model's results by examining labor supply elasticities of 0.1, 0.2, and 0.3 in addition to the baseline value of 0.0.

---

4 See, for example, Michael Parkin, *Economics*, Addison Wesley Publishing, 1993, Second Edition. Table 5.3 on page 109 lists price elasticities of demand for 20 industries in the United States. The elasticities range from 0.32 for coal to 1.52 for metals. Twelve of the elasticities are smaller than 1.0 and eight are larger than 1.0. The median price elasticity in the table is 0.9.

The table below summarizes the different values of each of the six input parameters to the macroeconomic model:

	Range of Values for Sensitivity Analysis	Best Estimate Values
Direct impact of SFAS 106 on labor cost in sector 2:	2.0%, 3.0%, 4.5%	2.5%
Labor share in total cost, sector 1:[5]	0.50, 0.64, 0.78	0.64
Labor share in total cost, sector 2:[5]	0.50, 0.64, 0.78	0.64
Fraction of labor employed in sector 2:	0.24, 0.32, 0.40	0.32
Price elasticity of demand:	1.5, 3.0	1.0
Labor supply elasticity:	0.0, 0.1, 0.2, 0.3	0.0

The total number of possible combinations of parameter values in the sensitivity analysis is found by multiplying the number of values of each parameter. This multiplication (3 x 3 x 3 x 3 x 2 x 4) yields 648 combinations of values. The current sensitivity analysis examines all of these combinations.

---

5 See Footnote 3 on page 11.

SECTION III

SUMMARY OF THE RESULTS OF SENSITIVITY ANALYSIS

The purpose of this section is to describe the results obtained when the "best estimate" parameters, as well as the remainder of the 648 combinations of parameter values described in the previous Section, are input to the macroeconomic model.

Best Estimate Results

When the best estimate values are input to the macroeconomic model, we find that only 0.3% of the increase in the LECs' costs due to SFAS 106 are recovered through the GNP-PI, while an additional 12.3% might be recovered through additional macroeconomic effects. Thus, under this scenario 87.3% of the increase remains unrecovered. This compares with our prior baseline result of 84.8% of the cost increase being unrecovered.

Results of Comprehensive Sensitivity Analysis

As noted earlier, we input all 648 combinations of parameter values into our macroeconomic model and tabulated the results. These results are enumerated in Exhibit 2, which begins on page 19 of this Section.

One new technical issue arose during the sensitivity analysis, when we varied the share of labor cost in total cost in sectors 1 and 2. When the share of labor cost in total cost is different in sector 1 than in sector 2, the equilibrium rental cost of capital in the model (the variable "r" in equation (A19) in Appendix C of the Godwins Report) changes. If the rental cost of capital decreases, then the LECs benefit from this decrease just as they benefit from the reduction in the equilibrium wage rate. However, if the rental cost of capital increases, then this increase in rental cost tends to offset the benefit to the LECs of the reduction in the wage rate. In some cases, the effect of the change in the rental cost can more than offset the reduction in the wage rate, thus leading to a negative value reported in column (B) [percentage of TELCO's additional SFAS 106 costs financed by potential reduction in relative wage and other macroeconomic effects]. This consideration of the effect of the rental cost did not arise in the discussion of the baseline calculation because both sectors had the same share of labor cost in total cost, and thus the rental cost of capital did not change in the baseline calculation.

Discussion of Extreme Values

In the sensitivity analysis reported in Appendix C of the July 1992 Supplemental Report, the lowest value for the share of additional SFAS 106 costs to be met from other sources was 60.1%. In the current sensitivity analysis which examines all 648 combinations of parameter values, some of the combinations of parameter values lead to values below 60.1% for the share of additional SFAS 106 costs to

be met from other sources. Below we explain why some of the combinations of parameter values lead to values below 60.1% and why these low values should be completely ignored.

Question 1: **Why do some combinations of parameter values in the current sensitivity analysis lead to a result lower than 60.1%?**

As stated in the July 1992 Supplemental Report, there are 648 combinations of parameter values. At the time of writing that report, we did not have the program available to analyze all of these combinations in an expeditious manner, so we had to choose a subset of those combinations to examine. Our choice of parameter values was guided by looking at the effects of changing one parameter at a time. As stated in the July 1992 Supplemental Report (p. 31), *"Four of the parameters were each set at the value that led to the largest increase in GNP-PI when the parameters were varied one at a time. (Price elasticity of demand = 3.0; share of labor costs in total cost, sector 1 = 0.78; share of labor costs in total cost, sector 2 = 0.78; initial fraction of labor force employed in sector 2 = 0.4.)"* We then examined all possible combinations of the remaining two parameters (four values of the labor supply elasticity, and three values of the direct impact of SFAS 106 on labor costs in sector 2). As it turned out, among these 12 combinations, the lowest value of the percentage of additional SFAS 106 costs to be met from other sources (60.1% in column (C)) was obtained when the labor supply elasticity and the direct impact of SFAS 106 on labor costs in sector 2 were each set at the values that led to the largest increase in GNP-PI when the parameters were varied one at a time (labor supply elasticity = 0.3, and direct impact of SFAS 106 on labor costs in sector 2 = 5%).

Subsequent to the completion of the July 1992 Supplemental Report, we developed a computer program to examine several hundred parameter combinations expeditiously. We used this program to examine all 648 combinations of parameters in the original Godwins report and in the July 1992 Supplemental Report. This analysis revealed that the combination of parameters leading to 60.1% for column (C) is indeed the combination of parameter values that produces the largest effect on GNP-PI [reported in column (A)]. Specifically, that combination of parameter values produced a value of 26.0% for the percentage of incremental SFAS 106 costs reflected in GNP-PI [column (A)], and this value of 26.0% was the highest value among all 648 combinations. However, as it turned out, the combination of parameter values that yields the highest value in column (A) does not locate the combination that yields the lowest value in column (C). The reason is that column (C) is calculated as:

$$\text{column (C)} = 100\% - \text{column (A)} - \text{column (B)}$$

where column (B) is the percentage of additional SFAS 106 costs financed by a potential reduction in the wage rate and other macroeconomic effects (including any change in the rental cost of capital).

The smallest value in column (C) corresponds to the highest value of [column (A) + column (B)]. As it turned out, the sensitivity analysis in the July 1992 Supplemental Report successfully located the highest value of column (A) among all 648 combinations but did not locate the highest value of [column (A) + column (B)]. Specifically, the earlier sensitivity analysis did not include some combinations of parameter values that lead to a relatively large reduction in the wage rate and/or the rental cost of capital, thereby leading to relatively large values of column (B).

To sum up, because the sensitivity analysis in the July 1992 Supplemental Report did not examine all 648 combinations of parameter values, it did not locate the lowest value of (C). The current sensitivity analysis examines all 648 combinations of parameter values.

Question 2: **Why should we completely ignore those combinations of parameter values that lead to values smaller than 60.1% for the percentage of additional SFAS 106 costs to be met from other sources [column (C)]?**

The current sensitivity analysis examines a complete set of 648 combinations of parameter values. Ten of these combinations lead to values in column (C) smaller than 60.1%. All ten of these parameter combinations have the following characteristics:

1. **The price elasticity of demand is 3.0. As discussed on page 12, the price elasticities of demand for sectors 1 and 2 are almost surely less than 1.0. A value of 1.5 for the price elasticity of demand was used in the baseline calculation to guard against understating the impact of SFAS 106 on GNP-PI. The value of 3.0 used in the sensitivity analysis is too high to be plausible, and we recommend ignoring calculations that use a value of 3.0 for the price elasticity of demand.**

2. **The direct impact of SFAS 106 on labor costs in sector 2 is 4.5%, which is an upper bound on the true value of this parameter according to the sensitivity analysis of the actuarial study. In fact, this value is well beyond both the best estimate of 2.5% and the more conservative baseline value of 3.0%.**

3. **The share of labor cost in total cost is 0.78 in sector 1 and less than 0.78 (either 0.64 or 0.50) in sector 2 (the sector that provides OPEBs subject to SFAS 106). However, we are very**